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UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR FEBRUARY 1939

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ADMINISTRATION

The First Deficiency Act for the fiscal year 1939, approved March 15, provides $3,000,000 to enable the Bureau to cooperate with State and local agencies in combating incipient and emergency outbreaks of insect pests and plant diseases. The amount appropriated is less than the amount requested in the Department and Budget estimates, making it necessary to materially reduce the cooperative work to be carried on under this appropriation. The activities to be conducted under this appropriation, as approved by the Secretary, include cooperation with States to suppress the incipient outbreaks of the white-fringed beetle and prevent its spread; cooperation with States in control of the Mormon cricket; and cooperation with States in the control of grasshoppers.

In the work on control of grasshoppers, first attention will be directed to the protection of cultivated crops. A limited amount of work will, however, be carried on in cooperation with certain States on idle land to control grasshoppers that have migratory tendencies, such as the lesser migratory grasshopper in parts of Montana, Wyoming, North Dakota, and South Dakota and the long-winged grasshopper in parts of Colorado, Texas, and Oklahoma.

In discussions before the Budget and committees of Congress, the Department committed itself to provide adequately for suppression work against the white-fringed beetle and by general agreement it was understood that provision would be made for the enforcement of the Federal quarantine on account of the white-fringed beetle by allotments from this appropriation until such time as funds were otherwise provided for that purpose.

W. E. VON ROSENBERG

William Edward von Rosenberg, Associate Plant Quarantine Inspector, Division of Pink Bollworm Control, died at San Antonio, Tex., on January 26, 1939, at the age of 42 years. Mr. von Rosenberg was connected with the pink bollworm activity exactly 20 years, entering the Department of Agriculture on January 25, 1919, in the unit known at that time as the Federal Horticultural Board. He was graduated from Texas A. & M. College with the Class of 1918, and served as Second Lieutenant in the Army prior to entering the service of the Department.

FRUIT INSECT INVESTIGATIONS

A stable emulsion of ethylene dichloride.--Oliver I. Snapp reports that studies made at the Fort Valley, Ga., laboratory show that ethylene dichloride, emulsified by a simplified method for control of the peach borer, results in an unusually stable emulsion. A batch of 50-percent ethylene dichloride emulsion prepared by the simplified method on October 10, 1938, was holding up well on February 28, 1939, and appeared to be just as stable on the latter date as on the day it was made. The simplified method of preparation consists of the addition of eight volumes of water to one volume of potash fish-oil soap, containing approximately 30 percent of soap, after which nine volumes of ethylene dichloride are added and the constituents emulsified cold by pumping. A 50-percent emulsion of ethylene dichloride prepared in this way was kept at the Fort Valley laboratory for a period of 41 days without breaking down and with no reduction in its effectiveness against the peach borer.

Cube extract increases effectiveness of oil sprays against red scale.--A. W. Cressman, of the Whittier, Calif., laboratory, reports that spray tests against California red scale on lemons have shown that the effectiveness of oil sprays can be markedly increased by the addition of cube extract to the oil, using a mixture of trichloroethylene and dibutyl phthalate as a mutual solvent. A field spray containing 2 percent of a heavy oil killed only 59 percent of the mature scales in heavy infestations on the older wood. The addition of cube resins at the rate of 1 part to 4,000 parts of dilute spray increased the mortality to 94 percent. A higher mortality was obtained on other parts of the plant. On the leaves sprayed with oil alone the mortality was 94 percent, while no survivors were found on the leaves treated with oil-cube in a count of 1,000 scales. Cube extract has produced a larger increase in mortality when combined with the lighter oils than when used with heavy oils. In another series of field sprays using 1.5 percent of oil, mortalities of mature scales on the heavily infested old wood treated with heavy and light medium oils were 58 and 32 percent, respectively, the difference being significant. These mortalities were increased to 91 and 93 percent by the addition of cube extract, 1 to 4,000. The cube resins used in these tests contained 22 percent of rotenone. Laboratory tests have given similar results except that the differences between materials have been greater. Applications of heavy and light medium oils to infested fruit produced mortalities of 76 and 55 percent, respectively. When cube extract, 1-5,000, was combined with the same oils, mortalities were increased to 99 percent in both cases. The cube extract used in the laboratory tests contained 30 percent of rotenone.

Headquarters for survey unit moved from Little Rock to Chattanooga.--The headquarters for the mobile entomological laboratory operating in the Southeast on the survey of insects in peach orchards where the phony peach disease occurs was moved from Little Rock, Ark., to Chattanooga, Tenn., on March 6. A fixed laboratory is being organized at that point to study the host-plant relationships of certain peach insects suspected of being the possible vectors of the phony disease. The studies relating to foliage-feeding insects will follow the usual insectary methods, but special arrangements are being made to study and test the root-feeding forms. The work remains a joint set-up with the Division of Domestic Plant Quarantines. The vector and virus studies are in cooperation with the Bureau of Plant Industry. The new laboratory is located at 700 North Crest Road, East Chattanooga, Tenn. The post office address is Box 5038, East Chattanooga, and the telephone is Chattanooga 2-3245. In driving to the laboratory from Chattanooga, one should take Tennessee Highway 58 east off from Market Street on 4th Street and follow this highway a distance of approximately 6 miles through East Chattanooga to the foot of Missionary Ridge, then turn right off Highway 58 up the ridge two blocks to North Crest Road. There is street car and bus line service from Chattanooga to East Chattanooga. W. F. Turner is in charge of the laboratory.

MEXICAN FRUITFLY CONTROL

Fruitfly increases.--The adult fruitfly population in the Rio Grande Valley, as revealed by trap catches, was higher in February than during any similar period in the history of this project. In January, only 154 flies were trapped, but early in February trap catches rapidly mounted and by the close of the month 2,150 flies had been submitted for identification. Many of the female flies were gravid when trapped. Some oviposition evidently took place late in January as the first larval infestation was discovered on February 14. Before the month closed 18 properties were listed as being infested. The fruit from these properties was harvested without delay and all fruit suitable for market was sterilized by the heat method before shipment.

JAPANESE BEETLE CONTROL

Regrouping of Dutch elm disease eradication and sanitation activities.--Beginning March 1, there was a regrouping and consolidation of the data accumulated concerning eradication, sanitation, and selective work performed by Dutch elm disease crews. Eradication of confirmed trees continues as a separate item. Elm-sanitation removals have been subdivided into a number of types of work, as follows: Beetle-infested trees, tagged dead and dying trees, dead and dying trees removed under a blanket permit covering an entire section, intensive local sanitation, clear cutting of "hot spots" of infection, and elms near confirmed trees. Also considered as a part of the sanitation operations are the disposal of woodpiles and the pruning of beetle wood. These sanitation operations have as their primary purpose the destruction of the fungus causing the disease and of beetle-infested material. The selective work has for its objective the reduction or simplification of field work and is not based directly on any disease or insect aspect of the program. It comprises such activities as the creation of elm-free areas, either through clear cutting or other operations, for the purpose of reducing costs and limiting the extent of the field activities.

Sodium dichromate counteracts corrosion.--Use of quantities of copper sulphate solution in tests made by the section engaged in the development of control methods has presented difficulties, owing to the corrosive action of the solution on most containers. When wooden barrels were used, the metal hoops were eaten away. Tin was soon corroded. Finally, copper kettles were obtained at considerable expense. In testing various mixtures in the tree-medication work, it was noted that an equal part of sodium dichromate solution added to the copper sulphate solution checked corrosion and the mixture could be kept in tin cans.

First-record Dutch elm disease confirmations.--Location of a confirmed tree in the town of Greenville, Orange County, N. Y., further extended the infected zone in that State. This confirmation is about 3 miles north of a 1938 confirmation located in the town of Minisink in the same county. The 10-mile protective zone surrounding the infected zone has been moved outward to include an additional 30.5 square miles. Another first record involves a tree found during elm-sanitation work at Upper Black Eddy, Bridgeton Township, Bucks County, Pa. This tree was within a mile circle of the confirmation found in Milford, N. J. The new point of infection increases the infected zone by 6.4 square miles.

Dutch elm work in swamps difficult.--Alternate freezing and thawing of swamp areas in which much of the work must be performed while the surface is frozen has considerably hampered the work during February. Thin ice and high water forced discontinuance of the work in some sections. In one swamp it was necessary to rush in and rush out as the receding and incoming water permitted. In another instance the crews built themselves a raft of logs from which to work. High water in the Delaware River also threatened to interfere with the work on several islands on which sanitation work is in progress.

Confirmations in beaver swamp.--Four Dutch elm disease cases were found during the month in a beaver swamp on the Sterling Mine property in the town of Warwick, Orange County, N. Y., approximately 1 mile north of the New Jersey State line. The trees were small and had been removed during the regular activities of sanitation crews engaged in removing dead and dying elms. The crews report that elm bark beetles are very plentiful in this swamp area.

Pennsylvania confirmations doubled.--Finding of 10 Dutch elm diseased trees in Pennsylvania during February doubled the number of confirmations thus far located in the State. Nine of the disease cases were found by elm-sanitation crews operating in Upper Makefield Township, Bucks County. The tenth tree was a first record in Bridgeton Township, in the same county.

Methyl bromide fumigant may revolutionize nursery practice to conform to Japanese beetle regulations.--Authorization on February 15 of methyl bromide as a fumigant for potted plants, plants in tubs, balled nursery stock and bare-rooted nursery stock marks the first time that research workers have found a satisfactory fumigant for this type of plant material. The absence of a satisfactory treatment for potted plants has been one of the major complaints of nurserymen and greenhousemen whose premises are infested by the Japanese beetle. The treating method provides that the nursery stock shall be fumigated with a dosage of 2½ pounds of methyl bromide per 1,000 sq. ft., including the space occupied by the nursery stock, for a period of 2½ hours, during which time the temperature of the soil and the air in the fumigation chamber shall not be lower than 63° F. The air-gas mixture must be circulated by means of a fan or blower throughout the entire period. A chamber completely lined with sheet metal is recommended. Advantages of this method are summarized in the following quotation from an article appearing in the March 1939 number of "Horticultural Topics," a publication of the New Jersey Association of Nurserymen: "New Jersey nurserymen should realize business to the extent of at least $250,000 annually as a result of the recently approved method of using methyl bromide for fumigating nursery stock to be shipped outside the Japanese beetle quarantined area, if the method proves as successful as information now available indicates. In making this prediction, Dr. C. C. Hamilton, of the State Agricultural Experiment Station, also pointed out that there will also be an actual saving of approximately $75,000 in the treatment of plants. * * * Most of the necessary cooperative experimental work was done in New Jersey nurseries. 'Nurseries of the State participated in what is probably one of the most important steps yet taken in the development of better methods of treating nursery stock to be shipped outside the quarantined area,' Dr. Hamilton said. 'New Jersey nurserymen who utilize this method will benefit in three distinct ways: First, there should be a saving of from 3/4 cent to 2½ cents per plant on the cleaning costs of deciduous trees and shrubs shipped without a soil ball. Second, there will be a decided saving in the treatment of balled nursery plants. In addition to being cheaper, the methyl bromide treatment appears safer than treatments with carbon disulphide emulsion or paradichlorobenzene. Third, the new method makes unnecessary the growing of nursery plants in soil treated with arsenate of lead. Heretofore, the cost of treating an acre of soil with lead arsenate has been approximately $200.'"

Molding sand exempt in revised Japanese beetle regulations.--An important change in the Japanese beetle quarantine regulations, as revised effective February 20, was the exemption of molding sand from the certification requirements. This exemption was based on experimental work performed at the Moorestown, N. J., research laboratory. Tests showed that although Japanese beetle eggs will hatch in molding sand, larvae cannot survive. In New Jersey and several other districts this exemption released the services of several inspectors usually assigned to the supervision of molding-sand shipments and permits them to devote more time to nursery and greenhouse certification and other activities that have been short-handed.

Atlanta, Ga., soil treatments for Japanese beetle.--Lead arsenate applications in the section where 122 Japanese beetles were trapped in Atlanta last summer were started January 30 and completed February 15. A total of 15.8 acres was sprayed at the rate of 1,000 pounds of lead arsenate per acre.

Timber salvage increases gypsy moth inspection.--District inspectors stationed in the lumber areas of New England report that the timber felled by the hurricane of September 21, 1938, is being salvaged as fast as possible. The logs are being sledded or trucked from woodlots to waterholes, ponds, and lakes for storage, where they will be protected from borers until the mills can take care of the production. Many logs are being piled in open fields near woodlots, where portable mills are engaged in sawing the logs into square-edge lumber for sticking on the lots. It is thought that about 25 percent of the lumber can be absorbed by local markets during the current year. This hold-over will greatly increase the gypsy moth inspection of lumber for the next 2 or 3 years. It is estimated that over 50 percent of the pine timber in the affected region was felled by the hurricane.

Heavily infested lumber inspected.--Tops for the month in infested products inspected and certified for movement from the regulated area was a carload of lumber inspected at Rochester, N. H., for movement to Sparrows Point, Md. In the course of piece-by-piece inspection of the boards in the shipment, 109 gypsy moth egg masses were removed. In addition, 24 egg masses were removed from 3 cords of birch fireplace logs, 13 from 2 carloads of lumber, 12 from 5 other shipments of forest products, and 1 egg cluster each from 5 shipments of mixed granite.

Gypsy moth inspection activities at Boston Sportsman's Show.--Twenty-five of one hundred and twenty-five exhibitors whose arriving exhibit material was checked at the Boston Sportsman's Show subsequently moved their stock to nonregulated territory under certification. Many of the exhibitors did not continue with their exhibits to the New York City show. Complete cooperation from the exhibitors and officials of the show aided inspection and certification of the products. Three inspectors were required for 1 day, to complete the inspections.

Gypsy moth infestation decreases in eastern Massachusetts.--According to general observations by the district inspector located at Middleboro, Mass., there is a considerable decrease, as compared to last year, in gypsy moth infestation in woodland areas adjacent to nurseries in eastern Massachusetts and the Cape Cod section.

FOREST INSECT INVESTIGATIONS

Western pine beetle invades isolated stands in Coast Range of California.--An outbreak in groups of thrifty, 90-year-old ponderosa pines has been found in the Los Posados State Park in Napa County, within 100 miles of San Francisco, according to K. A. Salman, Berkeley, Calif. Seldom have group infestations been found in the very few similar small, isolated stands in the bay region. Those stands are many miles distant from the extensive pine forests of the north Coast Range or of the Sierras, where heavy infestations can be expected.

High proportion of 1938 brood trees carry overwintering stages of western pine beetle.--R. C. Hall, Berkeley, reports that an analysis of data from 13 permanent sample plots on the Modoc National Forest, Calif., has shown that a high proportion of the ponderosa pine killed in 1938 will carry some stage of the western pine beetle over winter. Of the total volume killed, 67 percent was found to contain living brood in various developmental stages as late as the first week of November; 16 percent contained recent attacks; 15 percent, larval stages; 26 percent, a mixture of mature larvae and pupae; 10 percent, a mixture of pupae and adults; and 33 percent, abandoned cases. This is in addition to stages in trees which had not started to fade at the time of the late fall cruise. Also there has been a considerable increase in the number of trees and volume carrying overwintering stages in 1938, as compared to 1937 at approximately the same date. For the plots sampled, there are over 6 times as many trees and 3 times as much volume carrying brood in 1938 as in 1937. The condition in northern California appears to differ from that in Oregon and Washington,[1] where a sharp drop occurred between the summer and winter generations.

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[1] News Letter for November (vol. 6, no. 1, p. 8, Jan. 1, 1939).

The Prescott Matsucoccus scale on ponderosa pine.--Work on Matsucoccus vexillorum Morrison at Prescott, Ariz., has been carried on during the last two seasons by H. L. McKenzie, of the Berkeley, Calif., laboratory, to determine the seasonal history, effect of feeding on ponderosa pine, distribution, and relation of the scale to the so-called "twig blight." Histological studies indicate that the insect feeds from storage cells of the cortex area, and that there is an apparent internal break-down of cell contents, as well as cell-wall disintegration beneath aggregations of feeding Matsucoccus scales. Statistical work indicates the following: (1) Flagging, or fading of the twigs, is the result of a high population density of Matsucoccus scale; and (2) flagging is a contributing factor to the natural control of the scale insect, thus accounting for the fluctuations of flagging throughout successive years.

Matsucoccus scale infesting sugar pine in California.--In June 1936, G. R. Struble, Berkeley, observed and recorded scale infestations of Matsucoccus sp. on heavily flagged young sugar pines in the Yosemite region; however, no further work was done on the scale insect until the fall of 1938, when flagged and green branches were collected for study. H. L. McKenzie reports that preliminary work on this material indicates the following: (1) The scale, Matsucoccus sp., apparently prefers to settle principally on the main bole in the upper crown of the tree, although many were observed on the lateral branches. (2) On the main bole, they tend to congregate in large numbers under the bark scales about the nodes from which lateral branches arise, as well as around nodes on the branches themselves. (3) Where the scale settles in large numbers about these nodes there is a decided swelling of the nodes and also a copious flow of resin in the immediate vicinity of the insects. (4) This resin flow tends to "pitch out" the scale and also form a resin lesion where the branch arises from the node, and this lesion kills the branch. Nodes on lateral branches that are likewise heavily infested with scale insects may have lesions that ultimately kill the branch. (5) These flagged sugar pine branches may be confused with those commonly associated with blister rust.

A new pinon Matsucoccus in California.--On November 5, 1938, J. E. Patterson and S. T. Carlson, Berkeley, collected twigs from pinon pine (Pinus monophylla) near the Chuchupate ranger station on the Santa Barbara National Forest, Calif. These twigs were heavily infested with a new species of Matsucoccus (det. by H. Morrison). Approximately 320 acres of pinons showed evidences of heavy defoliation.

Peak losses from mountain pine beetle outbreak in lodgepole pine reached in 5 years.--Recent further analysis of survey data concerning the severe outbreak of the mountain pine beetle in lodgepole pine on the Beaverhead National Forest, Mont., indicates that approximately 5 years elapsed from the time the infestation invaded the area until peak losses were reached. When this outbreak developed in the vast lodgepole pine stands of the Beaverhead Forest it attacked the large, overmature, slowly growing trees, which are the most desirable host material and in which it multiplies rapidly. Such material, the merchantable, high-value timber of the forest, lasted for 5 years, but at the end of that time the average-sized tree available for attack was much smaller in diameter, faster growing, and more resistant to attack, the latter condition being reflected the following year in the higher mortality of the attacking beetles and a decrease in the number of insects maturing and emerging. In 1932-33 unseasonably cold weather is believed to have been the cause of an abrupt decrease of this outbreak. Had the infestation run its normal course, the reduction noted in the sixth year of the outbreak would almost certainly have been followed by rapid decreases in subsequent years, as the diminishing broods were either forced to invade the remaining trees or to fly to areas containing more favorable host material.

Black Hills beetle epidemic reappears in Black Hills.--Not since the historic outbreak occurring in the Black Hills between 1895 and 1908, when from 1 to 2 billion board feet of ponderosa pine were killed, have the losses in this area been so great as they are at the present time, according to Dwight A. Hoster, of the Fort Collins, Colo., laboratory. During the old epidemic the lack of information resulted in the infestation sweeping over and practically denuding the entire limestone region of the Black Hills. The present epidemic is being controlled simultaneously on Forest Service, National Park, and State Park lands, each organization taking care of its portion of the infestation. It is believed that this cooperation and combined treatment of between 10,000 and 12,000 infested trees will result in early suppression of the present outbreak.

New host records for some bark beetles.--In working over the scolytids collected from tree cages on limber, lodgepole, and ponderosa pine, in connection with studies on the biology of the Black Hills beetles in Wyoming and Colorado, Donald De Leon reports that several new host records have apparently been obtained. As some of the smaller species may possibly have worked their way through the 18-mesh wire used for the cages, not all of these records, especially of *Pityophthorus*, should be considered as conclusive evidence that the host given is the correct one. The hosts and the insects are listed below.

Insect	Host
Carphoborus sp.	*Pinus flexilis* James
Hylurgops rugipennis (Mann.)	do.
H. lecontei Sw.	do.
Trypodendron sp.	do.
Ips integer (Eich.)	do.
I. guildi Blkm.	do.
Pityogenes knechteli Sw.	do.
Pityophthorus murrayanae Blkm.	do.
P. caelator Blkm.	do.
Pityokteines minutus Sw.	do.
Do.	*Pinus contorta* Loud.
Pityophthorus caelator Blkm.	do.
Crypturgus sp. (collected from roots)	*Pinus ponderosa* Lawson

Forest tent caterpillar eggs scarce in Minnesota.--R. W. Nagel reports that in January the Milwaukee, Wis., laboratory, in cooperation with the Forest Service, began the collection of data on the abundance and condition of forest tent caterpillar eggs on recreational areas of high value within the Superior and Chippewa National Forests, Minn. The results so far tend to substantiate the prediction, made at the end of the 1938 season, that the infestation in 1939 will be unimportant from the National Forest recreational standpoint. Because of the cold and rainy weather conditions during May, comparatively few larvae of the heavy 1938 population survived the second instar. Of those remaining, a high percentage was killed during the late larval instars and the pupal stage by parasitic Hymenoptera and Diptera.

Abundance of bark beetles in weakened and dying elms.--D. E. Parker and W. C. Baker, of the Morristown, N. J., laboratory, have submitted a report that deals with the elm bark beetle infestation found in certain areas in Pennsylvania. In these plots elms growing within 1/2 mile of others that had previously been found to be affected with the Dutch elm disease were either pruned of all dead and dying wood, or were cut down and destroyed because they were considered 50 percent or more dead, this work being done by the Bureau's Dutch elm disease eradication unit. A total of 350 trees were pruned and 224 other trees were destroyed. The 350 pruned trees had an average of 1.98 square feet of bark area that had been attacked by elm bark beetles (Scolytus multistriatus Marsh.and Hylurgopinus rufipes Eich.). Of this area, 8.3 percent contained living bark-beetle brood. The 224 trees that were classed as dead and dying had an average of 12.36 square feet of bark area that the beetles had attacked. Of this, 14.5 percent contained living brood. The trees considered to be 50 percent or more dead accounted for 87.4 percent of infested bark area removed in the plots. S. multistriatus was more numerous than H. rufipes in the material examined.

Toxicity studies summarized.--S. F. Potts, of the New Haven, Conn., laboratory, has recently made a partial summary of data from toxicity studies conducted during the last 10 years on 22 forest- and shade-tree insects. Some of the highlights of these studies are as follows: The ratio of water to solid matter in the food and insect, and the pH of the food, were not found to be good indices of the Median Lethal Dose (M.L.D.) for insects when stomach poisons were used. Usually insects feeding on coniferous foliage required more inorganic poison for a M.L.D. than the same insects when feeding on foliage of broad-leaved trees. It is possible that the rosin present in the foliage of conifers interfered with the breaking down of the insecticide. In general, monophytophagous species were more susceptible to organic insecticides than polyphytophagous species. Decrease in toxicity of arsenicals was correlated with increase in fat content of the body. Since a larva may be twice as resistant to poison near the end of the last instar as at the beginning of this instar, it is necessary to determine the M.L.D. for the insect at the beginning and end of the last instar. The foliage of approximately 50 forest-tree species was found to be slightly acid (pH 4.2 to 5.6). The foliage of no tree species tested gave an alkaline reaction. Commercial brands of arsenicals having different particle size gave practically the same degree of toxicity. Insects that had unpoisoned food in their alimentary tracts were somewhat more resistant to stomach poisons than when their digestive tracts were empty. A laboratory method was developed for studying the toxicity of stomach poisons for (1) leaf-eating insects and (2) twig-boring forms. Another method was developed for measuring more accurately the effectiveness of insecticides against forest insects in the field. These methods have proved to be much more satisfactory than any previously used.

Factors influencing gypsy moth measured quantitatively.--H. A. Bess, New Haven, Conn., submits the following statement on gypsy moth ecological studies: "The second season's study on the influence of natural factors on the mortality and fluctuations in the population density of the gypsy moth, in areas where no artificial control measures are applied, gave encouraging results. The data obtained indicate that a large part of the mortality that occurred during the different stages of the insect could be measured quantitatively with considerable accuracy. From a careful examination of the dead insects, it was possible to determine in many instances the probable cause of death. During the larval period, which extends over a period of about 3 months, the mortality was measured daily This procedure gave the daily fluctuations in the mortality rate and an opportunity to study more closely the probable influence of weather factors on these fluctuations. These quantitative data on the mortality caused by various factors, notably low winter temperatures and certain biotic factors, throughout the different developmental stages of the insect, have eliminated some of the difficulties encountered in attempting to evaluate the effectiveness of these factors from data that gave only the percentage of the population affected by certain factors (i.e., parasites) on particular dates throughout the season."

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Adverse weather retards gypsy moth work.--Much time was lost because of stormy weather during the first half of February in all localities where Federal W. P. A. gypsy moth work is being conducted and progress in scouting and burning work was seriously retarded. By the middle of February it was necessary for gypsy moth crews to use snowshoes only on the high elevations in Vermont and in the Berkshire Mountains in Massachusetts. Continued unfavorable conditions during the rest of the month greatly hampered scouting work, but provided an opportunity for the disposal of considerable brush that had accumulated in infested localities where ground work and selective thinning had been recently done.

Eligibility and citizenship of all W. P. A. gypsy moth workers checked.--The W. P. A. Division of Intake and Certification is at present reviewing the relief eligibility status of all workers assigned to duty on W. P. A. projects, and arrangements are being made with the supervisory personnel of this project so that all of the workers assigned to W. P. A. gypsy moth work may be reinterviewed before the end of March. Also, during the last week in February, citizenship affidavits were obtained from all W. P. A. workers employed by this Bureau, with the exception of those absent from duty because of injury, sickness, or personal reasons. Any W. P. A. worker whose affidavit, properly executed, has not been submitted prior to March 5 will not be permitted to perform service after that date. Those workers who are not citizens or who do not owe their allegiance to the United States will be dropped from the work on February 28.

Several small infestations found within barrier zone.--Three additional gypsy moth infestations have recently been located in the town of Ripton, Addison County, Vt., within the barrier zone. A total of nine colonies have been found in Ripton to date. These infestations were established by windspread of the small caterpillars last spring from an infestation to the east of the zone. Two infestations have been located in the adjoining barrier zone town of Goshen, seven in Granville, and two in Hancock, all established through the same source. All of these colonies are small, most of them consisting of a single egg cluster.

Small infestations found near barrier zone in Massachusetts.--Nineteen gypsy moth infestations have been discovered in Plainfield, Mass., since scouting was begun in that town on December 19, 1938. Most of the infestations consisted of only 1 egg cluster, which indicates clearly that they were established by windspread last spring. All other infestations found in that town to date are small and were undoubtedly established as a result of windspread in the spring of 1937. Plainfield is just outside the barrier zone area and borders Windsor, which is within the barrier zone.

Cordwood from private estates given to poor families.--The agent stationed at Glen Head, Long Island, N. Y., has recently spent a considerable part of his time inspecting cordwood in preparation for its removal from private estates in that part of Nassau County which is regulated on account of the gypsy moth. For the most part, this wood was cut by needy families to whom the wood was given on condition that the brush be disposed of as the cutting progressed.

Scouting work completed on powder company property.--Gypsy moth scouting work on the property of the Dupont Powder Company, situated in the township of Pittston and extending into the township of Lackawanna, Pa., was completed on February 11. All egg clusters found were creosoted, but burlapping, and possibly spraying, will be necessary next spring in order to eradicate the infestation.

Efficient barbwire rewinder developed by gypsy moth employees.--Recently, while Government employees were removing approximately 52,000 lineal feet of barbwire used in connection with the spraying of an isolated gypsy moth infestation found in Damascus Township, Wayne County, Pa., during the fiscal year 1938, the property owners became greatly interested in the apparatus developed by this project for rewinding barbwire onto reels. The machine consists of a frame made of angle iron with a removable iron bar for inserting and removing the reels. A crank handle works a system of gears and exerts a very strong pull on the wire. The apparatus is portable, is easily anchored where needed, and has a guide for winding the wire evenly on the reels. This device does the work required efficiently and saves considerable labor. It is used in connection with reels made of heavy wire which are light, strong, and demountable, and which can be purchased at a low cost.

Railroad lines and sidings mapped in Pennsylvania.--A regular employee of this project has recently been detailed to map all railroad sidings located within the area under quarantine on account of the gypsy moth in Pennsylvania. This information will be useful in making periodic inspections of sidings and in checking the movements of railroad equipment likely to harbor gypsy moth infestations. Main railroad lines will also be correctly located on scout maps, which are used by the crews in the field, so that a composite railroad map of the quarantined area may be prepared when the survey is completed.

Unusual shipment inspected for gypsy moth.--In that area in Pennsylvania which is under State quarantine on account of the gypsy moth, 2,749 shipments were inspected and certified and 3,102 shipments were moved under permit during the month of January. In connection with this work, 11 new gypsy moth egg clusters were found and destroyed at the point of origin. Among the materials inspected were approximately 500 mine sprags, which are wooden pins about 2 feet in length and 3 inches in thickness, and tapered to a point at each end. They are thrust into the openings of car wheels and used as brakes by the workmen when they wish to retard or stop the mine cars. This is the first inspection of sprags reported since work was begun in Pennsylvania in 1932.

C. C. C. gypsy moth work progressing on greatly reduced scale.--Fire-hazard-reduction work is still taking much time that had been planned for C. C. C. gypsy moth work. For the week ended February 11, 1939, 736 6-hour man-days were used on C. C. C. gypsy moth work under the supervision of this Bureau, while 2,017 man-days that normally would have been used on gypsy moth work were diverted to fire-hazard-reduction work. Approximately 37,500 6-hour man-days had been taken from gypsy moth work and used on emergency work up to February 11. Most of the gypsy moth work consisted of selective thinning and burning brush and debris, although some time was spent in training men for climbing work with ropes and ladders. This work will be pushed as rapidly as possible on days when the trees are free from snow and ice.

PLANT DISEASE CONTROL

Different crew formation given trial in Michigan.--F. E. Powers, State leader in charge of barberry eradication in Michigan, reports that during the winter months a slight deviation from the usual method of strip scouting of timbered areas has been tried. As in the past, the distance between workers in crews of from 8 to 10 men is gauged according to the density of vegetation in the territory being covered. Rather than working abreast, however, the second worker starts after the guide has advanced about 6 to 10 paces, the next after the second advances 6 to 10 paces, and so along the line. Instead of each worker searching the ground on both sides of him, the usual procedure, he covers only that portion between him and the man whom he is guiding. Preliminary results indicate that the men maintain better intervals, converse less with their neighbors, and appear to miss fewer bushes in crews where this procedure has been adopted.

Barberry eradication in Missouri since 1935.--In a letter sent to all men who since 1935 have been employed in connection with the barberry-eradication program in Missouri, George M. Frandsen, State leader in charge, points out that 18,500 barberry bushes have been destroyed as a result of a detailed inspection of about 1,700 square miles in the northern part of the State; 24 counties have been completed and some work has been done in 14 additional counties; and barberry bushes have been found on a total of 1,180 properties.

State W. P. A. program supplements Federal program in Minnesota.--In December 1938 the Minnesota Works Progress Administration approved a State program to supplement work that is being done with Federal project funds. The supplemental program provides for 910 man-months of employment. According to L. W. Melander, State leader in charge, trained and experienced men have been retained as supervisors in connection with the State program and crews have been organized in a manner similar to those paid with Federal funds. The same degree of efficiency is expected.

Blister rust damage.--C. C. Perry, State blister rust leader for Massachusetts, has prepared the following table to show blister rust conditions in the Crane infection plot at present, as compared with the situation at the time this study plot was established in 1923. The plot is located in Ipswich, Mass.

Item	1923	1938
	Number	Number
Healthy pines	36	45
Pines that will die	102	7
Pines that will recover	4	0
Dead pines	1	91
Live cankers	1,089	8

The increase in the number of healthy trees arises, of course, from the fact that some pines originally classed among those that would die, actually recovered through the failure of branch cankers to reach the trunk. It will be noted from these figures that a condition of stability has been reached in this stand. There are only 7 pines that have active cankers, and it is not certain that all of these cankers are still functioning. The eradication of wild *Ribes* on the Crane Estate was completed during the course of initial work in August 1923 before the establishment of the study plot was even contemplated. For that reason no data are available to definitely show the number of wild *Ribes* actually on the plot or within a contiguous protection zone. However, on the 75 acres in the block (Tilton Hill) where the plot is located the crew found and destroyed 2,076 wild gooseberries (*Ribes hirtellum*) and 506 escaped red currants (*R. sativum hybridi*). These bushes were old plants of optimum size and the leaves were heavily infected. Most of the bushes were found growing along stone walls. There were no cultivated *Ribes* on Tilton Hill, but many *Ribes* were under cultivation northeast of the plot at a point approximately 2,000 feet from the plot. In August 1923, 12 large European black currants (*Ribes nigrum*) were eradicated and in September of the same year 85 red currants, 36 cultivated gooseberries, and 3 flowering currants were also destroyed. It has always been questionable whether influence of the wild *Ribes* was sufficient to cause the damage on this plot. There has been an inclination to infer that conditions, especially fog, may have been so favorable that sporidia from the large patch of cultivated *Ribes* may have been responsible for some of the infection. Since 1923, there has been a slight recurrence of *R. hirtellum* on Tilton Hill and actually in the plot. These recurring *Ribes*, however, have been extremely weak specimens and have apparently failed to cause infection on the plot, as no cankers originating since 1922 have ever been noted.

Spread of blister rust.--In Virginia blister rust infections were found on white pines at three new locations in Rockingham County. In Ohio infection on white pine was found for the first time in Cuyahoga County on January 9. Only one infected pine was found. Infected *Ribes nigrum* and *R. rubrum* were found within 100 feet of this pine in 1934.

COTTON INSECT INVESTIGATIONS

Effectiveness of insecticides against three cotton insects.--The efficacy of several insecticides and mixtures of insecticides against the boll weevil, the cotton leaf worm, and the tarnished plant bug was tested in 1938 at Tallulah, La., by G. L. Smith, A. L. Scales, and R. C. Gaines. The tests against the boll weevil and tarnished plant bug were on caged cotton plants out of doors and those with the leaf worm were laboratory tests with fifth-instar larvae by a modified sandwich method. Fourteen brands of commercial calcium arsenate were used in the tests against the boll weevil and the leaf worm. In 1937 the coefficient of correlation between the percentage of water-soluble As_2O_5 by the New York method and net mortality of boll weevils was significant, and in 1938 highly significant. There also appears to be considerable relation between water-soluble As_2O_5 and net mortality of the cotton leaf worm, the samples having the highest water-soluble As_2O_5 usually causing the highest mortalities and those containing low water-soluble As_2O_5 causing somewhat lower mortalities. The dosages required to kill 50, 95, and 99 percent of the fifth-instar leaf worms were determined and, in general, the smallest dosages were required for the calcium arsenates containing high percentages of water-soluble As_2O_5 and the largest dosages were required for the calcium arsenate containing a low percentage, with the intermediate falling between the low and high. Tests were also made against the boll weevil and cotton leaf worm with three commercial calcium arsenates and with four fractions of each of three calcium arsenates obtained by means of a centrifugal air separator by the Division of Insecticide Investigations. The fractions differed in particle-size distribution and there was also considerable chemical difference in the fractions obtained from the calcium arsenate with high and medium water-soluble As_2O_5 by the New York method and only slight chemical difference in the fractions made from the calcium arsenate low in As_2O_5. In general, the fractions containing particles of largest average size also had the highest percentages of water soluble As_2O_5 by the New York method and were most effective against the boll weevil and cotton leaf worm, and the fractions with the finest particles contained the least water-soluble As_2O_5 and were the least effective. In other tests against the boll weevil a practically pure di-calcium arsenate caused a significantly higher mortality than two basic calcium arsenates and a commercial calcium arsenate. A mixture of equal parts of calcium arsenate and sulphur, and a mixture of one part of calcium arsenate to three parts of sulphur caused a slightly lower mortality of boll weevils than the calcium arsenate, but the differences were not significant. Nicotine bentonite and mixtures of nicotine bentonite and tannate caused significantly lower mortalities than any of the calcium arsenates tested. The addition of from 0.3 to 1.0 percent of wetting agents (Aresket 300, Areskap 100, and Vatsol-OS) to commercial calcium arsenate did not increase or decrease significantly the net mortality of boll weevils and cotton leaf worms. Three cryolites containing from 70 to 91 percent sodium fluoaluminate caused significantly lower mortalities of boll weevils than did calcium arsenate, and the cotton leaf worm mortalities were also somewhat lower with the cryolites. The addition of the above-mentioned wetting agents to the cryolite did not appear to materially change the effectiveness of the original samples. In tests against adults of the tarnished plant bug, derris containing 4.3 percent rotenone was only slightly more effective than when diluted with sulfur to contain approximately 1 percent rotenone, while both the derris and the derris-sulfur mixture were more effective than sulfur alone. The addition of wetting agents to the derris, sulfur,, and derris-sulfur mixture did not materially affect the net mortality.

Control of boll weevil with calcium arsenates containing different percentages of water-soluble arsenic pentoxide.--A series of 7 tests using calcium arsenates containing high, intermediate, and low water-soluble As_2O_5 by the New York method for boll weevil control, conducted at 6 stations of this Division and one test by the Texas Agricultural Experiment Station last season have been reported by R. C. Gaines of Tallulah, La. Tests were made at Florence, S. C., by F. F. Bondy and C. F. Rainwater; at Gainesville, Fla., by C. S. Rude; at State College, Miss., by R. L. McGarr; at Tallulah, La., by R. C. Gaines and M. T. Young; at Port Lavaca, Tex., by K. P. Ewing; and at College Station, Tex., by R. W. Moreland and by J. C. Gaines of the Texas Experiment Station. Two tests were conducted by the Bureau at College Station, making a total of 8 tests. Plots of 1/30 acre were arranged in blocks selected at random and each treatment was replicated from 4 to 7 times in each locality, making a total of 45 replications. Treatments consisted of dusting with calcium arsenates containing on an average 0.5, 4.6, and 10.3 percent of water-soluble As_2O_5, as determined by the New York method. The low and intermediate calcium arsenates contained an average of 43.5 percent of total arsenic pentoxide, and the highs 45.5 percent. The calcium arsenates were applied with hand dust guns at the rate of 5.4 to 6.9 pounds per acre at 5-day intervals, beginning when 10 percent of the squares were punctured. Analyses of variance of infestations and of yields were made at all localities with the checks included and also with the checks omitted. The infestation records, observed in percentages, were also transformed to equivalent angles for use in the analysis of variance. When the checks were included in the analyses the difference between treatment infestations and treatment yields were highly significant. When the checks were not included these differences were not significant. The conclusions regarding treatment infestations from the analyses using equivalent angles were identical to those using percentages. In other words, there was no significant difference between different calcium arsenates cotaining low, intermediate, and high water-soluble arsenic pentoxide by the New York method. The only significant differences were between poison treatments and the untreated checks.

Winter mortality of pink bollworm larvae.--A. J. Chapman, of the Presidio, Tex., laboratory, reports the results of the monthly examinations to determine the progressive winter mortality of pink bollworm larvae in bolls on the plants and in bolls on the surface of the soil for the last 2 years as shown in the following table.

Treatment	Mortality in--					
	December		January		February	
	1937	1938	1937	1938	1937	1938
	Percent	Percent	Percent	Percent	Percent	Percent
Bolls on plants--------	13.00	8.81	18.05	26.01	25.09	35.63
Bolls on soil surface--	16.20	27.51	12.26	34.01	42.85	32.38
Average------------	15.05	18.16	15.15	30.01	33.97	34.00

It can be seen from this table that the average mortality, as shown by the final examination in February, was about the same for both years. The

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minimum temperature for the 2 years was the same, 18° F. The mean minimum temperature was much lower this year than last. There was a total of 492 hours below freezing this year, as compared to 134 hours last year. The percentage of mortality was obtained by examining at the end of each month 300 bolls attached to plants and 300 bolls placed on the surface of the soil in November. The average number of worms per boll had been determined by examination of a large sample of bolls at the beginning of the experiment early in November.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Autogiro survey of wild cotton in southern Florida.--The autogiro survey work, which was begun in southern Florida early in February, was continued throughout the month. After general observation flights were made, a survey was first made over the Cape Sable area. During these flights no new colonies of wild cotton were found; however, a good many stray plants were noted. Approximately 350 wild cotton plants were located from the air and destroyed as a result of the survey of this area. These plants appeared to be 2 or 3 years old and were no doubt the result of seed disseminated by the 1935 hurricane. After the Cape Sable area was completed, flights were made over the Ten Thousand Islands section. Several hammocks heretofore not worked were located in the lower part of this section and wild cotton plants on one of the hammocks were plainly visible from the autogiro. One or two small hammocks were spotted deep in the mangrove swamp. The exact locations of these hammocks were indicated on a map of the section so that crews could scout them later for wild cotton plants. The last observations were made from Everglades to Fort Myers and over various islands and the shore line of Charlotte Harbor. No new wild cotton locations were found during these flights but some new possible locations were observed. The inspector in charge of the work in this particular area estimates that the autogiro flights saved 2 or 3 weeks' scouting with a crew of men. The aerial survey for the entire area was completed on March 7.

Field clean-up in pink bollworm infested area of Salt River Valley.--Field clean-up in the area east of Gilbert, Ariz., which has been in progress for the last several months, was practically completed at the close of March 10, when the last two labor crews were dismissed. Cleaning of 3,110 acres had been completed at the end of the campaign. Weather and field conditions improved considerably during the last few weeks, and much better headway was made in all phases of the work than when operations were first started. Ground material could be burned readily after being raked into windrows, eliminating the process of piling it on the stalk piles to dry. The hard, dry state of the ground expedited the progress of cutting stalks with the sled cutters, as the knives did more effective work under these conditions. Some stub cotton remains to be destroyed in the area but this work is under way and should be completed within a short time.

Thurberia-plant eradication in Arizona.--The W. P. A. camp of laborers engaged in destroying Thurberia plants in southern Arizona is being moved from Ventana Canyon, in the Santa Catalina Mountains, to a location near the Continental Ranch, just west of the Tucson-Nogales Highway. Arrangements have been made for an adequate supply of water from the main well of the Continental Ranch. A few plants have been removed from areas nearest the cultivated cotton produced in the vicinity of Continental and Sahuarita. Up to this time Thurberia weevil infestation in bolls from these plants has been negligible. During the month of February the crews covered 12,900 acres of gound and a total of 53,038 Thurberia plants were located and destroyed.

Laboratory inspection of green cotton bolls.--During the fall months a large quantity of green bolls from the 1938 cotton crop were collected from counties in Texas, Oklahoma, and other States, to be examined for pink bollworm infestation at the San Antonio, Tex., laboratory during the winter and spring months. These bolls were collected from areas near regions known to be infested with the pink bollworm, and from other areas in which little or no gin-trash inspection was made during the last season. As these bolls are collected they are placed in metal drums of 15-gallon capacity, in a solution of zinc sulfate, which serves as a preservative. Bolls placed in this solution remain green and in perfect condition for an indefinite period. The inspection of this material was begun in December and is being carried on at this time. During the period a large number of sea-island cotton-boll samples from southern Georgia and northern Florida have been examined, with negative results as to pink bollworm infestation. A small amount of material, collected from several fields north of Allende, Coahuila, Mexico, was inspected in the laboratory early in the season, resulting in the finding of several specimens of the pink bollworm. Examination of bolls collected from plantings on the American side, nearest this infestation, followed immediately but there were no indications of the presence of pink bollworms in this material. Inspectors have recently completed the inspection of several hundreds of boll samples from southwestern Oklahoma and are now engaged in the examination of bolls from Refugio, Calhoun, Victoria, and other coastal counties of Texas.

Planting in the quarantined areas of southern Texas.--Planting of the 1939 crop in the lower Rio Grande Valley district and the Coastal Bend district, where initial pink bollworm infestations were discovered in 1936 and 1938, respectively, is now well under way. Owing to climatic conditions, planting can be started in these areas earlier than in other sections of Texas. Several plantings were reported early in February but, owing to unusually cold weather prevailing at that time, germination was extremely poor and cotton came up to only a fair stand. This cotton has made very little progress. We are accordingly informed that approximately 230,000 acres will be planted to cotton this coming season in the lower Rio Grande Valley district and around 200,000 acres in the Coastal Bend district. At the close of February it was estimated that approximately 50 percent of the entire cotton acreage in the area had been planted.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Protection of tobacco bulks against tobacco moth.--W. D. Reed and J. P. Vinzant, of the Richmond, Va., laboratory, report that experiments conducted during the fall of 1938 demonstrated that bulks of tobacco could be protected against infestation by Ephestia elutella Hbn. by covering these bulks with plant-bed cloth in open warehouses or by using the tobacco-plant-bed cloth as a covering over bulks of tobacco in growers' packhouses, supplemented by weekly applications of pyrethrum powder directed against the adult moths. In the experiment in an open-storage warehouse an examination of the bulks protected by the tobacco-plant-bed cloth showed that there was a reduction of approximately 99 percent in the hands of tobacco thus protected, as compared to tobacco bulks exposed to infestation by the tobacco moth. Only a trace of infestation was found in tobacco bulks present in a grower's packhouse which had been protected by plant-bed cloth during the time when the adults of *E. elutella* were present in the packhouse, supplemented by weekly dustings with pyrethrum powder. In each experiment the tobacco-plant-bed cloth was removed weekly and treated to destroy the tobacco moth eggs that had been deposited thereon.

Resistance of certain plants to the pepper weevil.--According to observations made by J. C. Elmore, of the Alhambra, Calif., laboratory, there appears to be a chance to avoid severe injury by *Anthonomus eugenii* Cano and the harmful residues which often result from insecticide applications to control this pest, by developing a strain of pepper plants resistant to or tolerant of the weevil. During the course of field observations extending over several years in southern California it has been apparent that certain pepper plants produce a fair crop of peppers, notwithstanding attack by the weevil, particularly those plants that set their pods early and mature to a point where they can be harvested before the weevils become sufficiently abundant to cause severe damage. On the other hand, the pods produced late in the season on plants of apparently the same variety of peppers, intermingled with the resistant variety, are subject to severe attack by the pepper weevil, with resultant loss to the grower. In other instances certain of the resistant plants may produce 30 or 40 pods, while the nonresistant may have only 1 or 2 pods or possibly none, and those produced are usually injured severely. The cause of this apparent resistance has not been ascertained, although it is possible that it may be attributable to early maturity, rapidity of growth, or some physiological factor.

Kernels of corn and wheat superior to legume seeds or yeast as food for wireworms.--C. E. Woodworth, of the Walla Walla, Wash., laboratory, reports that during the 4-month period ended March 1, larvae of the sugar beet wireworm (*Limonius californicus* (Mann.)) and of the Pacific coast wireworm (*Limonius canus* (Lec.)) have been kept on 11 different diets in order to determine the effect of such diets upon their weight and growth. During this period the various food combinations have continued to demonstrate very clearly their relative nutritional value. It has been found that the starchy foods, such as corn and wheat, are by far the best of the foods supplied. These 2 foods are superior to the others in the group, whether fed in sterilized or unsterilized form. Wheat has proved to be slightly superior to corn when the former is sprouted before being fed, although corn has shown itself superior to wheat after the former has been cooked for a short time. Of the legumes, the seeds of peas are generally better than those of beans, although lima beans are in general better food for wireworm larvae than are navy beans. Larvae fed uncooked beans have made greater gains in weight and growth than those fed cooked beans. In these tests yeast undiluted has proved to be a very poor food for wireworm larvae, evidencing its lack of proper nutritional values for this insect by the death of approximately 55 percent of the test insects and a pronounced loss in weight to the surviving individuals at the expiration of a 4-month period.

Control of joint infestation of Mexican bean beetle and corn ear worm on lima beans.--In summarizing the results of an experiment conducted on Fordhook lima beans at Norfolk, Va., late in the summer and early in the autumn of 1938, L. W. Brannon reports that dust mixtures or sprays containing cryolite controlled successfully an infestation of Epilachna varivestis (Muls.) in association with Heliothis obsoleta (F.). The cryolite-dust mixtures consisted of 60 parts of cryolite to 40 parts of sulfur or of talc, by weight. The cryolite sprays were made up at the rate of 3 pounds of cryolite to 50 gallons of water. Cryolite dusts and sprays increased the yield approximately 70 percent, as compared to the check, whereas plots to which sprays of derris or cube had been applied showed yield increases ranging from 30 to 40 percent. In view of the fact that the Mexican bean beetle infestation in the field where the experiment was staged was not unusually severe, the larger yield increases from the use of cryolite were attributed principally to the superior effectiveness of this material against the corn ear worm, since previous experiments have demonstrated that derris and cube are of very little value against this pest. This is borne out by the fact that examinations of wormy and uninjured pods from one series of the plots where a cryolite-talc mixture had been applied and from the untreated plots showed that the insecticide treatments resulted in a reduction of 30 percent in wormy pods per plot at harvest, as well as in an increase of 65 percent in the number of pods produced per plot, as compared to the untreated plots. Previous experiments with the corn ear worm on lima beans had shown that when it attacks young or immature pods many of them drop from the plants, contributing greatly to the reduction in yield ordinarily caused by the ravages of this insect.

FOREIGN PLANT QUARANTINES

Methyl bromide not effective for lima bean scab.--A report dated February 21, 1939, from Anna E. Jenkins, of the Bureau of Plant Industry, indicates that the methyl bromide treatment which seems to eliminate Maruca testulalis (Geyer) from lima beans is not effective for the lima bean scab (Elsinoe phaseoli Jenkins). Diseased pods from lots treated at New York for M. testulalis and later placed in moist chambers showed the same amount of growth of the fungus as the checks. Pure cultures of E. phaseoli in test tubes and petri dishes, whether given a dosage of 4 pounds or of 6 pounds for 90 minutes while open, showed no checking of growth of the pathogen in comparison with the checks. These treatments were given in Washington on February 6 by R. Latta, who is carrying on experimental work with the treatment.

Pink bollworm intercepted in the mail.--On February 7 two living larvae of Pectinophora gossypiella Saund. were taken at New York from an immature cotton boll found among some green herbs (tea bushes) in the mail from Jamaica. This is our first record of the interception of this insect from that country. On February 16 three living larvae of the pink bollworm were intercepted at New York in mail from England. The infested cottonseed were found in a small wad of seed cotton which had been used as packing for earrings.

Hornets imported with bananas.--While inspecting a trainload of bananas at El Paso on the night of November 24, 1938, Inspector A. K. Pettit observed what appeared to be a large russet fruit hanging from one of the side walls in an ice bunker. Closer inspection revealed the supposed fruit to be a nest of small hornets. Fortunately, the temperature was below freezing and the insects were so chilled that they offered no resistance and Mr. Pettit was able to remove the nest intact. The hornets proved to be Polybia occidentalis, a species not reported as occurring in the United States. It is recorded as being present in Brazil, Ecuador, British Guiana, and the Panama Canal Zone.

Asiatic rice borer found in hog food.--The German SS Spreewald arrived in New Orleans with two pigs on board. An examination of the pigs' food disclosed 400 pounds of rough rice with stems attached, which was approximately 90 percent infested with living larvae of the rice stem borer (Chilo simplex Butl.). The rice and stems were purchased in the Philippine Islands.

Packing of exhibits for Golden Gate International Exposition.--In connection with the finding and disposition of prohibited foreign materials, inspectors have been kept busy during the past month supervising the removal and destruction of prohibited rice-straw packing concerned with exhibit material arriving from various foreign countries, consigned to the Golden Gate Exposition at San Francisco. Many of these cases contained priceless wares and porcelains, requiring very careful handling and therefore involving an unusual number of man-hours of supervision.. To date, nearly 1/2 ton of such packing, taken from a total of 293 cases, has been removed and destroyed under proper safeguards. The shipments concerned originated in Straits Settlements, Java, Japan, China, and Indo-China. Shippers and consignees are cooperating fully in the handling of these shipments.

Species of Bruchus and Apion intercepted in vetch seed.--The following species of Apion and Bruchus have been intercepted in vetch seed from various foreign countries. Many of these interceptions were made in vetch which contaminated straw jackets used on imported liquors.

Insect	Country of origin
Apion abruptum Sharp	Japan
Apion cerdo Gerst.	Spain, Union of Soviet Socialist Republics
Apion craccae (L.)	England, Germany, Poland, Scotland
Apion ochropus Germ.	France
Apion pomonae (F.)	Belgium, England, France, Germany, Ireland, Italy, Netherlands, Poland, Portugal, Scotland
Bruchus altaicus Fahr.	Turkestan
Bruchus atomarius (L.)	Germany, Union of Soviet Socialist Republics
Bruchus brachialis Fahr.	Czechoslovakia, France, Germany, Hungary, Italy, Netherlands, Palestine, Spain
Bruchus dentipes ochraceosignatus Heyden	Union of Soviet Socialist Republics
Bruchus emarginatus Allard	France
Bruchus hamatus Miller	Turkey
Bruchus laticollis Boh.	France, Italy
Bruchus luteicornis Ill.	Belgium, England, France, Cuba, Hungary, Italy, Netherlands, Scotland
Bruchus rufipes Hbst.	Czechoslovakia, England, France, Germany, Hungary, Italy, Netherlands, Poland, Portugal, Scotland, Switzerland, Union of Soviet Socialist Republics
Bruchus tristiculus Fahr.	Hungary, Italy, Morocco
Bruchus tristis Boh.	Italy
Bruchus viciae Oliv.	Czechoslovakia, Germany, Hungary, Italy

Entomological interceptions of interest.--Two larvae of the fruitfly Anastrepha fraterculus (Wied.) were intercepted at Jacksonville, Fla., on October 19, 1938, in an orange in ship's stores from Brazil. Seven living larvae of the Mediterranean fruitfly (Ceratitis capitata Wied.) were intercepted at San Pedro, Calif., on November 2, 1938, in two figs in ship's quarters from Hawaii. The infested figs were found in a waste basket. A living specimen of the mango weevil (Sternochetus mangiferae F.) was taken at Boston on November 13, 1938, in a mango fruit in ship's stores from the Union of South Africa. Living specimens of the coccid Lichtensia lutea (Ckll.) arrived at Hidalgo, Tex., on November 12, 1938, on a croton plant in baggage from Mexico. A living adult of the weevil Apion ononicola Bach was intercepted at New York on November 16, 1938, on a white turnip leaf in ship's stores from France. A living specimen of the acridid Opshomala vitreipennis (Marshall) was found on November 13, 1938, at the airport at Brownsville, Tex., on a gardenia in cargo from Mexico. Pupal fragments of the pink bollworm (Pectinophora gossypiella Saund.) were taken at Chicago, Ill., on November 14, 1938, in cottonseed in the mail from St. Kitts, British West Indies. Adults of the tenebrionid Liodema kirschi Bates arrived at New Orleans on November 14, 1938, under the bark of a cedar log in cargo from Honduras. Specimens of the scale insect *Aspidiotus lenticularis* Ldgr. were intercepted at Washington, D. C., on September 9, 1937, on a hazel tree in the mail from Italy. Living specimens of the whitefly *Trialeurodes varia* Quaintance and Baker were taken at Nogales October 30,1938 on a geranium leaf in baggage from Mexico. A living larva of the yam weevil (*Palaeopus costicollis* Marsh.) was intercepted at Honolulu, T. H., on May 13, 1938, in a yam (*Dioscorea* sp.) in baggage from the Philippines.

Pathological interceptions of interest.--*Ascochyta vodakii* Bub. was intercepted on December 6, 1938, at New York in a shipment of *Hepatica acutiloba* from Poland. *Ascochytula grossulariae* Died. was intercepted at New York on January 20, on *Ribes grossularia* cuttings in baggage from Germany. *Cercospora lantanae* Chupp was intercepted on cuttings of *Lantana camara* in baggage from Bermuda on February 10, at New York. *Cercospora* sp. was found on convolvulus leaves on the landing gear of an airplane from the American Virgin Islands on December 14, 1938, at San Juan. *Cercospora* sp., no species reported on host, was intercepted at Brownsville on January 1, in mail from Mexico at the airport. *Elsinoe australis* Bitancourt and Jenkins was found at Philadelphia on July 5, 1938, on an orange from Brazil. *Gymnosporangium* sp. was found on a mountain ash berry in a shipment from Poland on January 31 at New York. The species of *Gymnosporangium* occurring on *Sorbus* in Europe are not reported on fruit but on leaves only. A husk tomato fruit intercepted at El Paso on February 10, was spotted with a gray feltlike growth resembling that of *Helminthosporium* sp. which has been intercepted on tomatoes. *Heterosporium echinulatum* (Berk.) Cke. was intercepted on carnation leaves from British Columbia on February 23 at Seattle. *Phyllosticta hibisci* Pk. was intercepted on January 27 at New York on the leaves of hibiscus cuttings in baggage from Bermuda. A *Phyllosticta* found on *Camellia japonica* plants from Japan offered for entry under special permit at San Francisco was determined as possibly *P. camelliaocola* var. *meranensis* Bubak reported from Austria. *Ustilago vailantii* Tul., with spores smaller than the description calls for, was found in flowers of a shipment of cipollino bulbs from Morocco.

DOMESTIC PLANT QUARANTINES

Changes in project leaderships.--Claude Wakeland, who since March 1938 has directed Mormon cricket control activities under the supervision of the Division of Domestic Plant Quarantines, has been designated field director of both Mormon cricket and grasshopper control activities. R. A. Roberts, who was assistant project leader on the Mormon cricket work in 1938, has been selected to succeed Mr. Wakeland. W. E. Dove will continue as project leader of grasshopper control in the same capacity as in 1938. A field director for both projects is considered necessary because of the extensiveness of the area, the magnitude of these projects, and the complex problems involved, which require careful study and frequent conferences of an emergency nature between Federal and State cooperating officials concerning which prompt decision and action are required. The project leaders, because of the multiplicity of administrative responsibilities, cannot devote sufficient time to an analysis of the many field problems encountered in the execution of so large a program. This is particularly true of grasshopper control.

Grasshopper control activities.--Preliminary arrangements are being made for grasshopper baiting operations in the approaching season pending actual appropriation for the control work. Organizational and educational meetings are being carried on and, as rapidly as possible, the programs are being worked out with State and county leaders so that plans will be complete in all areas as soon as baiting is practicable. Plans are being made to cooperate with farmers and State agencies to control grasshoppers on idle and nonresident land from which destructive flights of these insects are expected. To carry out these broad-scale operations large numbers of mechanical bait spreaders will be needed throughout the season. For the construction and assembling of these spreaders, several thousand sets of drawings and instructions are being provided to State leaders and county agents for distribution throughout the infested region. These efforts are being supplemented by those of two agricultural associations of the Northwest and by railroad companies, in assisting in locating adequate local storage for advance shipments of bait materials and in urging the construction of a sufficient number of bait spreaders.

Railroads exhibit grasshopper control.--Traveling institutes containing exhibits on grasshopper control are being operated throughout Minnesota, North Dakota, and South Dakota by two railroad companies of that region. Federal and State grasshopper control workers are participating in these institutes which are attended by crowds of from 500 to 1,000 persons daily.

Storage facilities for grasshopper bait to be increased.--In addition to obtaining local storage in each county for materials to be used in baiting grasshoppers in any operations conducted this year, arrangements are being made for large storage space at strategic points where reserve supplies of bait materials can be stored for use and reshipment during rush seasons. Five such points in the Northwest and 10 in the Southwest are being selected.

Mormon cricket control.--Preliminary plans for dusting operations in the coming season is going forward at the field headquarters at Salt Lake City, including estimation of the quantities of mixed dust needed for work in the 10 cooperating States.

Indian Agencies to help control hoppers and crickets.--The Office of Indian Affairs of the Department of the Interior is making preliminary arrangements with superintendents of Indian Agencies in the infested areas, for increased control operations in the Mormon cricket and grasshopper control campaigns in 1939, in cooperation with this Bureau and the States concerned.

White-fringed beetle control.--Quarantine enforcement is being carried out in cooperation with the States in the various areas and in line with the policy that effective compliance on the part of shippers can best be obtained through a full understanding of the measures gained by personal visits of inspectors. Larval inspection has been carried on to some extent in all infested areas, and close observation has been made as to any soil movement in construction work or with nursery stock. Larvae were recently found on 17 additional properties in the Monroeville, Ala., area. Larval checks have also been made at Florala, Ala., in fields to be planted to truck crops, in order to assist growers in selecting locations for such fields. Shippers of products of lumberyards, nurseries, mills, gins, and truck crops have been contacted by inspectors and informed as to sanitary measures that must be taken in order that products may be certified for shipment. Seed Irish potatoes and sweetpotatoes constitute a large percentage of the restricted articles now being moved from the regulated areas. Patrol inspectors are assisting in enforcement of the quarantine and shipments are either turned back or the soil is removed from plants or vegetables. In preparation for control operations, over 400 acres of land have been cleared in Mississippi and Alabama since the first of the year.

Sweetpotato weevil work.--Control and eradication activities relating to the sweetpotato weevil were carried out in February in cooperation with the States of Alabama, Georgia, Mississippi, and Texas. Inspections were made of infested properties and those adjacent, as well as nonregulated area. Sweetpotatoes stored both for consumption and planting were inspected and a check was made of plant-bed sites on properties released from quarantine. About 3,000 bushels of sweetpotatoes were moved under permit from Baldwin County, Ala., to southern markets. The freezing temperatures and excessive rains throughout the eradication areas in February have been effective in destroying any host plants remaining in the fields, thereby resulting, it is believed, in a high mortality of the weevils.

Progress in tree removal for control of peach diseases.--The destruction of diseased, abandoned, and escaped peach trees is going forward in 8 States infected with peach mosaic or phony peach disease, and included the removal in February of 710 mosaic-infected trees, and over 900,000 abandoned or escaped peach trees. Such activities in Georgia are being conducted in 14 counties and the work is nearing completion in a number of counties in the commercial area of that State. The Illinois Department of Agriculture reports that more than 500,000 worthless peach trees have been removed since the beginning of the project by that State over 2 years ago.

States modify quarantines on the phony peach disease.--Representative of standardized quarantine action to meet the current reduction in area infected by the phony peach disease, the States of Alabama and Illinois have recently modified their quarantines by eliminating from the regulated areas the States of Oklahoma and Maryland, as well as five counties in other States.

Two States extend peach mosaic quarantines.--State quarantines of California and Colorado relating to the peach mosaic disease were extended to include counties found infected in Colorado, Texas, and Utah in 1938.

Transit inspection.--With nursery-stock shipping at a low ebb in February except at more southern points, the number of interceptions for quarantine violations totaled 105. From Boston came the report of a marked increase in freight shipments, with the percentage of violations in freight exceeding by far that of any period during the previous 12 months. The principal restricted products seen at that station consisted of sawdust, reels, lumber, and marble chips.

Transit inspector's meeting at Chicago.--A general meeting, at which matters relating to transit inspection activities at the individual stations and plans for coordinating the work at the several stations to eliminate duplication of inspection were discussed, was held at Chicago on March 13 and 14. One of the features of the conference was a tour of the Post Office Terminal Building in Chicago, conducted by postal officials, and the operations of routing mail into and through that terminal were thoroughly explained. The meeting was attended by 11 transit inspectors including those representing various stations of the Midwest, 3 State cooperators, and a representative each of the Division of Foreign Plant Quarantines and of the Post Office department of the city of Chicago. M. J. Kelly, previously in charge of transit inspection in the Eastern region and since returned to Japanese beetle work, was present, also E. A. Burns, now in charge at the New York City station, and acting in charge of the Eastern region.

Chicago inspection points increased.--The Chicago Freight Tunnel System, which operates 62 miles of tunnels under the city streets and is connected with all important transfer freight houses, affords additional locations where plant shipments may be checked, the company having graciously arranged to provide such information as to such shipments to the transit-inspection office. Telephone calls from the company will indicate at which of their 4 stations and when shipments on the tunnels can be seen. Other points where similar arrangements for such contacts were recently made by transit inspector J. M. Corliss, are 3 carloading companies handling L. C. L. packages constituting 90 percent of the incoming and outgoing freight of this nature, 27 trucking concerns handling over 2,000 trucks carrying on interstate commerce, 2 electric lines, and an airport. The Railway Express Agency will make an actual count of their plant shipments arriving in Chicago in the first 10 days in April, representing a count of nursery stock shipments on 3,500 trains. This splendid cooperation on the part of the company will furnish the transit-inspection office with data as to trains carrying the greatest volume of plant material into Chicago for delivery there or to points beyond.

Citrus canker eradication.--Eight inspectors are assigned to search for citrus canker in Louisiana and 11 in Texas, to be assisted in tree removal by 210 relief laborers in the latter State. No infections of citrus canker were found in either State in February. In another reworking of 14 formerly infected properties in Brazoria and Galveston Counties, Tex., the inspectors found Citrus trifoliata on but 5 properties and these were only a few small seedlings. The bayou and canal areas of Terrebonne Parish, La., are being inspected with the use of a boat equipped with an outboard motor. This area is settled principally by muskrat trappers who live in houseboats and camps along the canal, and considerable numbers of citrus seedlings are being found at these sites. House-to-house inspection of Weeks Island, Iberia Parish, disclosed 25,700 small citrus trees, chiefly orange, and 300 Citrus trifoliata in a location where Satsuma oranges were planted about 25 years ago. House-to-house inspection has been completed in Saint Mary Parish, La.

CONTROL INVESTIGATIONS

Western States accept fumigation process.--A. C. Johnson reports that a fumigation process for fruit-bearing nursery stock, in which the nursery stock is fumigated with methyl bromide against the hibernating larval stage of the oriental fruit moth, has been practically completed. The present requirement is a dosage of $3\frac{1}{2}$ pounds of the fumigant per 1,000 cubic feet for an exposure of 4 hours at a temperature of 70° F. Heretofore, fruit trees grown in areas infested with the oriental fruit moth have not been permitted to enter certain Western States now free from this insect. One nursery in Missouri is using this process at the present time and more than 130 shipments have been treated.

INSECTICIDE INVESTIGATIONS

New adhesives for insecticides.--Most of the new synthetic organic insecticides, as well as the insecticides of plant origin, adhere poorly to vegetation to which they are applied and hence are easily removed by rain or wind. This seriously limits their usefulness. In order to overcome this lack of adhesiveness it is customary to add so-called stickers to the spray or dust. The Division of Insecticide Investigations has for some time been carrying on studies to find new materials that could be used with insecticides to make them adhere to foliage. L. D. Goodhue, of this Division, has found that certain chemical compounds and mixtures which, although nonadhesive at the time of application to plants with the insecticide, undergo a chemical change after exposure to sunlight and become adhesive, resinous, tacky, and insoluble in water. Materials of this class include the reaction products of furfural with aromatic amines, for example, beta-naphthylamine, aniline, and para-toluidine. Other materials which are suitable are the reaction products of furfural with certain ketones, for example, acetone, methyl ethyl ketone, acetophenone, benzophenone, and 2-naphthyl ketone. The material which is to act as an adhesive is intimately mixed, preferably by grinding, with the insecticide. United States patents 2,146,257 and 2,146,258, covering these inventions, were awarded Mr. Goodhue on February 7, 1939.

Investigation of pyrethrum flowers continued.--The structures of the two active principles of pyrethrum flowers, namely, pyrethrin I and pyrethrin II, have been studied by H. L. Haller and F. B. LaForge for some time. Although the complete structures of these compounds are not yet known, considerable progress has been made in this study. The fourteenth paper reporting the results of these investigations has just been published (Jour. Organic Chem., vol. 3, no. 6, pp. 543-549, January 1939). S. I. Gertler and H. L. Haller have determined the pyrethrin content of sprays made by stirring pyrethrum powder in kerosene and pouring off the supernatant liquid. They have recently reported (Soap, vol. 15, no. 1, pp. 93-94, January 1939) that the pyrethrins in pyrethrum powder are readily soluble in kerosene and that when pyrethrum powder is mixed with kerosene in the ratio of 1 pound to 1 gallon and allowed to macerate for 48 hours, about 94 percent of the pyrethrins in the powder become dissolved in the kerosene. However, because of the highly variable and generally poor quality of pyrethrum flowers on the American market, there is little likelihood that the purchaser will obtain a pyrethrum powder containing as much as 1 percent pyrethrins and, unless pyrethrum of this grade is used, the resulting kerosene extract using a ratio of 1 pound flowers to 1 gallon of kerosene will contain less than 100 mg. pyrethrins per 100 cc., the concentration considered necessary to make a good fly spray. Furthermore, in the process of decantation, there is a loss of about 27 percent in the volume of the solution. If low-grade pyrethrum powder is used, necessitating a ratio of powder to kerosene of possibly as high as 2 pounds to 1 gallon, the mechanical loss may be as high as 43 percent.

Information on fluorine insecticides.--R. H. Carter and Mrs. R. L. Busbey have compiled information from the literature through 1935 relating to the use of fluorine compounds for insect-pest control. The large volume of literature on this subject is indicated by the 692 references in their publication (U. S. Dept. Agr., E-466).

Chemicals used in tree injection.--R. H. Carter has compiled information (U. S. Dept. Agr., E-467) obtained from 116 publications and patents relating to the use of various chemicals for injection into trees and growing plants for the control of insects and fungi.

Literature on spray residues.--Mrs. Busbey has compiled information (U. S. Dept. Agr., E-463) from 786 publications and patents relating to insecticidal spray residues, especially arsenic, lead, and fluorine. The following topics are discussed: Public health aspects of the spray-residue problem; legal aspects, processes, and apparatus for the removal of spray residues from fruits and vegetables; the relation of spray programs to residues; methods of analysis for various types of spray residues; and the results of analysis of sprayed fruits and vegetables. This is the most complete publication to treat all aspects of the spray-residue problem that has appeared.

Recent data on derris and Lonchocarpus.--The wholesale price of powdered derris has recently declined sharply and powdered derris of 4-percent-rotenone content is now quoted at 2 cents a pound less than the equivalent grade of powdered cube. The principal reason for this is that high-grade derris containing from 8 to 10 percent of rotenone has recently become commercially available in this country. This high-grade derris is now obtainable from Sumatra, Java, and the Federated Malay States. D. R. Koolhaas, director of the laboratory for chemical research at Buitenzorg, Java, who recently visited the Department, informed us that he had analyzed a sample of derris grown in the Netherlands East Indies that contained 16 percent of rotenone. This figure is exceptional, but several samples examined by this Division have tested 10- or 12-percent rotenone. The highest rotenone content ever found in a specimen of Lonchocarpus is reported to be 20 percent. The highest rotenone content found in the devil's-shoestrings (Tephrosia virginiana) growing in Texas is 4 percent. The Department of Commerce has recently released figures on the importation of rotenone-bearing roots into the United States for the years 1936, 1937, and 1938. Last year the total importation of these roots into this country exceeded 3 million pounds. Assuming an average rotenone content of 4.5 percent, this material would make about 14 million pounds of insecticidal powder of 1-percent-rotenone content. These data show a very striking growth in the use of rotenone insecticides. When investigations were started on the chemistry of derris and cube about 10 years ago, neither of these products was commercially available. In the publication E-463, R. C. Roark has reviewed the use of derris as an insecticide for the period 1919-28. A further review, which will bring the history of the use of this product up to date, is now being prepared.

BEE CULTURE

Sex determination in honeybee similar to that in Microbracon hebetor.--The problem of sex determination in the honeybee has long baffled geneticists. Since Whiting's discovery of biparental males in the parasitic wasp Microbracon hebetor (Say), another hymenopteron that produces males parthenogenetically, speculation has arisen as to whether biparental drones are not to be found in the honeybee. The finding in the Beltsville, Md., apiary of a drone, termed by Whiting a haplo-diploid male mosaic, has added to interest in the problem. Whiting's original finding in Microbracon was occasioned by the occurrence of a few black-eyed drones in a culture headed by a queen homozygous for orange-colored eyes but mated to a male with black eyes, the dominant color. Consequently, crossing bees bearing the common eye color with those bearing some mutant eye color naturally suggests itself in trying to solve the problem in the honeybee. There are several mutant eye colors in the honeybee, white being the most common. In nature only drones have white eyes, and so the character is apparently recessive. Otto Mackensen, of the Southern States bee culture laboratory, Baton Rouge, La., last season obtained stock bearing white eye color and is now attempting to establish the occurrence of diploid drones through its use, after having already obtained indications, based on finding reduced viability in the brood of queens inseminated with sperm from more than one drone, that differential maturation actually occurs in the honeybee as postulated for Microbracon by Whiting in explaining the occurrence of diploid males in that form. Mackensen has obtained homozygous white-eyed queens by artificial insemination, and reports: "The necessary cross, homozygous white queens X normal drones, has now been made and the fertilized queens are being overwintered in an incubator. If none of these queens survive until spring sufficient stock is being overwintered in nuclei to make a repetition of this cross possible early in the spring. * * * If normal-eyed drones occur in the F_1 generation these must be biparental, because the normal condition can only be contributed by the drone parent." Mackensen reports in part concerning his work last season on the viability of brood: "In the spring of this year an experiment was begun, the purpose of which was to determine the effect of inbreeding on brood viability. There were two reasons for beginning such an experiment. (1) It was known that in the related form Microbracon inbreeding brings about a great reduction in egg viability and the appearance of biparental males. The inviable eggs are thought to represent biparental males which did not live to maturity. Since the occurrence of such males constitutes one of the most important parts of the evidence which Whiting brings forth in support of his theory of sex determination, a test for their occurrence in the honeybee might give some suggestion as to the manner of sex determination in this insect. (2) From a practical standpoint, it was of interest to find the fundamental cause of the low brood viability found in a certain strain of bees under test at the Laramie, Wyo., laboratory. Since this strain was rather closely inbred, as compared to another strain which showed a high brood viability, it seemed advisable to conduct an inbreeding-viability experiment to see whether inbreeding in general could be a fruitful cause of low brood viability. The following rather severe program of inbreeding was therefore planned. Two queens were selected, each of which was to head an inbred line. In each line part of the queens of each generation were to be back-crossed to the drones of the original queens (inbred) and part of them mated to drones from an unrelated strain (outcrossed). Then the viability of the brood of these inbred and outcrossed queens of each line was to be compared with that of the original queen of the line. The experiment was continued until it was found that the brood viability of both the inbred and outcrossed queens was greatly reduced and to about the same extent in the two classes of queens. This result showed clearly the presence of some factor which had a much greater effect upon brood viability than inbreeding, and the experiment was discontinued. In looking for an explanation for the above results, it was noted that the main difference between the naturally mated parent queens and the inbred and outcrossed daughter queens was that the parent queens had mated with one drone, whereas the daughters (artifically inseminated) had each been mated to several drones. It was therefore decided to test the brood viability of queens inseminated with only one drone in order to determine whether the reduction in viability was due to multiple matings or to the artificial insemination process. Two such queens started laying in time to make viability tests before winter, and the viability of the brood of these queens was found to be similar to that of the parent or naturally mated queen."

More royal jelly produced by bees fed sugar sirup than by those fed diluted honey.--S. E. McGregor, Baton Rouge, has compiled data indicating that bees in swarm boxes produce more royal jelly and accept more cells when they are given sugar sirup than when they are given diluted honey. The resulting queens also appear to be slightly heavier under these conditions. These data are shown in the following table.

Food given	Grafted cells		Royal jelly produced		Average weight of--	
	Offered	Accepted	Total	Average per accepted cell	Larvae	108 Virgins
	Number	Number	Gm.	Mg.	Mg.	Mg.
Sugar sirup----	1,440	1,229	164.4	134.0	36.0	196.0
Diluted honey--	1,440	1,021	83.6	82.0	27.0	187.0

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Record concerning supposedly rare ichneumonid parasite.--Seven specimens, determined by R. A. Cushman as *Schletterius cinctipes* (Cress.) (family Stephanidae), were received from G. R. Struble, of the forest-insect laboratory at Berkeley, Calif. Previously the species was represented in the National Museum Collection by only seven female specimens. The new series, however, contained four males. Although no previous indication of host association had been recorded, Mr. Struble reports that his material was reared from ponderosa pine infested with flat-headed borers and a species of siricid. It is suspected that the coleopterous larvae, rather than those of the hymenopteron, served as hosts, but this point requires verification.

A North American chalcid fly submitted from Guam.--Five specimens reared from lepidopterous pupae taken from a China Clipper plane at Inarajan, Guam, and forwarded by R. G. Oakley, have been identified by A. B. Gahan as *Brachymeria hammari* Cwfd., a North American species of Chalcididae that is parasitic on the oriental fruit moth, the strawberry leaf roller, and various other Lepidoptera.

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Reported habits of certain ants submitted for determination.--Ants determined by M. R. Smith as *Lasius niger* var. *sitkaensis* Perg. were found by W. W. Baker, of the Bureau's laboratory at Puyallup, Wash., "carrying *Byturus* larvae which had dropped to the soil." The same observer noted a species, determined by Mr. Smith as *Formica rufa obscuripes* var. *melanotica* Emery," feeding on stamens and pistils of raspberries at Tacoma, Wash." Species identified as *Monomorium minimum* (Buckley) and *Lasius niger* var. *americana* Emery were reported by investigators of the Division of Fruit Insects as preying on larvae of the codling moth at St. Joseph, Mo.

The name of the banded greenhouse thrips.--Since the recent list of "Common Names Submitted for Approval, 1939" has been sent for consideration to members of the American Association of Economic Entomologists, several inquiries have reached this Division concerning the combination *Hercinothrips femoralis* (Reuter), for which the common name "banded greenhouse thrips" is proposed. Floyd Andre has submitted the following statements in explanation of the change in the generic name from *Hercothrips* to *Hercinothrips*: "When *femoralis* was described in 1891 by O. M. Reuter, it was placed in the genus *Heliothrips* Haliday. Hood (1927 Psyche, 34: 233) erected the genus *Hercothrips* for several old species originally placed in *Heliothrips* and several new ones described at the time which had a costal fringe of bristles on the forewing, and wing venation somewhat different from that of the type of *Heliothrips* (*haemorrhoidalis* Bouche). This combination was accepted by almost all workers and was used until Bagnall (Ann. Mag. Nat. Hist., ser. 10, 10: 506, 1932) erected the genus *Hercinothrips* to include those species previously placed in *Heliothrips* and *Hercothrips* which have in common a head with a collar showing laterally a dentiform prominence, a strongly transverse pronotum which is much shorter than the head, and forewings with veins regularly set with bristles. The combination *Hercinothrips femoralis* is being used by most thysanopterists both in Europe and America and should be considered the proper designation for this species."

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